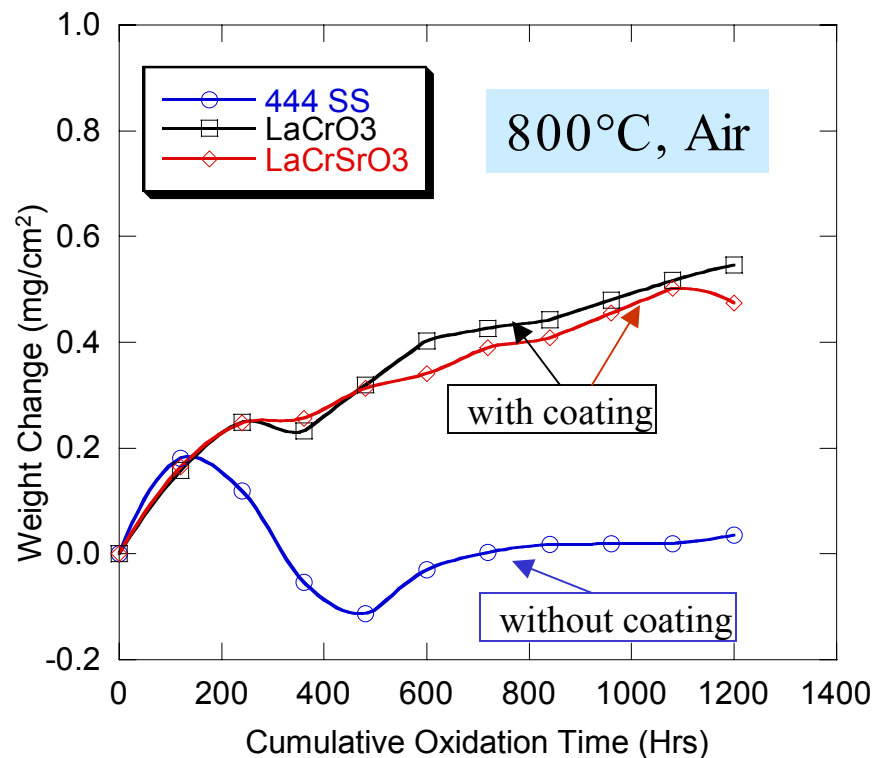


CAREER: Novel Conductive Oxide Coatings on Metallic Interconnect for Intermediate-Temperature SOFC Application

J.H. Zhu, Tennessee Technological University, DMR-0238113

Fuel cells are a radically new and fundamentally different energy conversion technology, generating electrical power (and heat) from a variety of fuels via an electrochemical process. In addition to high efficiency and low pollution, solid oxide fuel cells (SOFCs) offer the additional advantages of fuel flexibility and electricity/heat cogeneration. The major hurdle for their market entry is high cost. To reduce the cost of SOFCs, we are developing novel conductive oxide coatings on metallic alloy to replace costly ceramic interconnects. Here, the weight changes of coated and/or uncoated samples are monitored during 100 hr-10 cycle oxidation in air at 800°C.

Surf. & Coat. Tech., in press (2003).



Type 444 stainless steel with LaCrO₃-based coatings shows small weight gain and intact surface, while severe spallation and weight loss are observed for the bare 444 stainless steel samples after cyclic oxidation (100 hr – 10 cycle) at 800°C in air, indicating the effectiveness of the developed coating in protecting the stainless steel interconnects.

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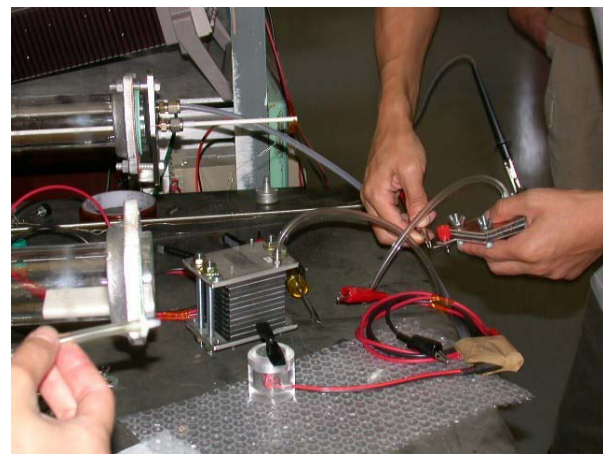
Educational Outreach:

PI organized a *Fuel Cells and Advanced Materials Camp* in June, 2003 for local high school students and their science teachers. Totally eight students and five teachers from five local high schools attended the three-day camp. This camp featured laboratory-based fuel cell material activities tailored to provide high school teachers and students with a tremendous learning environment and teamwork activities. Camp activities included:

- Lectures and demonstrations on the operation principles of fuel cells;
- Hands-on construction/testing of fuel cell modules;
- Active involvement in unique laboratory facilities to participate in fuel cell research and development;
- Field trip to Oak Ridge National Laboratory and American Museum of Science and Energy



High school students building fuel cells



High school students/teachers testing fuel cell stack